b. Profile of the cam when the axis of the follower is offset by 20 mm from the axis of the cam shaft

Cam profile G

Knife edge follower

F E D C B A

Cam profile G

S 5 4 3 2 1 0

6

H T

0'
1'
2'
3'
4'
5'
6'

J

K

L

M

N P

30° 60°

60° O

50 mm

20 mm

Offset circle
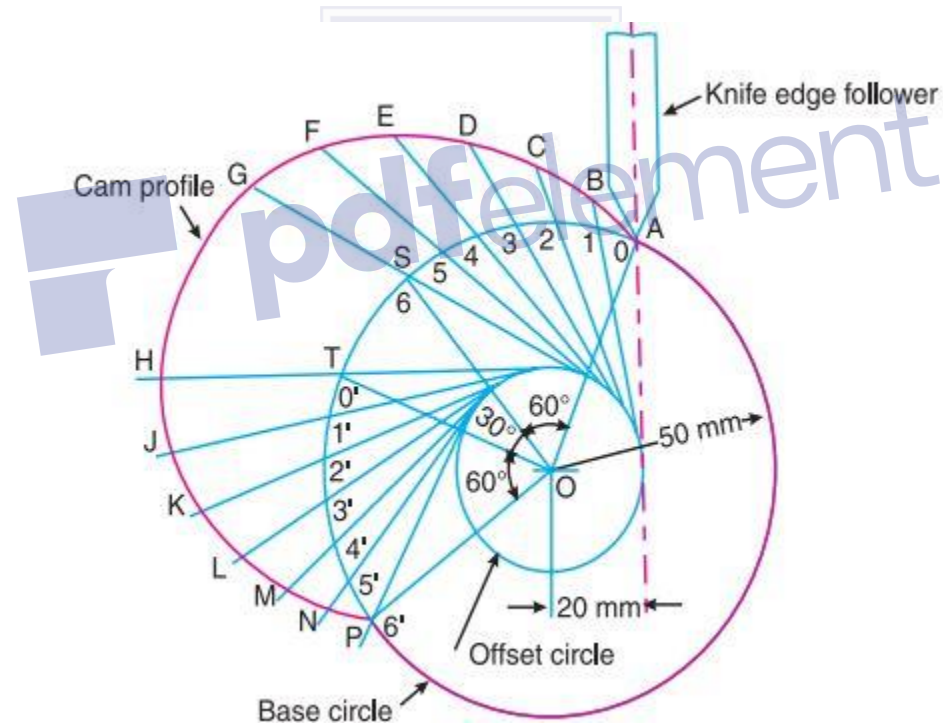
Base circle

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1. Draw a base circle with radius equal to the minimum radius of the cam (i.e.50 mm) with Oas centre.

2. Draw the axis of the follower at a distance of 20 mm from the axis of the cam, which intersects the base circle at A.

3. Join AO and draw an offset circle of radius 20 mm with centre O.

4. From OA, mark angle AOS= 60° to represent outstroke, angle SOT= 30° to represent dwell and angle TOP= 60° to represent return stroke.

5. Divide the angular displacement during outstroke and return stroke (i.e. angle AOS and angle TOP) into the same number of equal even parts as in displacement diagram.

6. Now from the points 1, 2, 3 ... etc. and 0,1,2,3 ″ ′ ′... etc. on the base circle, draw tangents to the offset circle and produce these tangents beyond the base circle as shown in Fig.

7. Now set off 1B, 2C, 3D... etc. and 0′H,1′J... etc. from the displacement diagram.

8. Join the points A, B, C...M, N, P with a smooth curve. The curve AGHPA is the complete profile of the cam.

A cam is to be designed for a knife edge follower with the following data :

1. Cam lift = 40 mm during 90° of cam rotation with simple harmonic motion.

2. Dwell for the next 30°.

3. During the next 60° of cam rotation, the follower returns to its original position with simple harmonic motion.

4. Dwell during the remaining 180°.

Draw the profile of the cam when

(a) the line of stroke of the follower passes through the axis of the cam shaft, and

(b) the line of stroke is offset 20 mm from the axis of the cam shaft.

The radius of the base circle of the cam is 40 mm. Determine the maximum velocity and acceleration of the follower during its ascent and descent, if the cam rotates at 240 r.p.m.